




Reproductive desires in transgender and gender diverse adults: A cross-sectional study in Thailand

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ABSTRACT

Objective: To explore the desires and barriers to fertility preservation among transgender women and gender diverse people assigned male at birth in Thailand.

Material and methods: This study is a cross-sectional study in clinic-based setting. The data was obtained from a questionnaire. Three hundred and three participants visiting the Gender Care Clinic at Chiang Mai University Hospital and Mplus clinics between April 2019 and December 2019 were included. Of these, 199 were transgender women and 104 were gender diverse people assigned male at birth.

Results: The overall parental desire was 30.4% which was similar across the 2 groups ($p = 0.897$). A genetically related child was preferred in 40.9% of transgender women and 50.5% of gender diverse group ($p = 0.115$). Factors impacting a parental desire were a good relationship with family (OR 2.905, 95%CI 1.315–6.420, $p = 0.008$), being in a stable relationship (OR 4.183, 95%CI 1.738–10.069, $p < 0.001$) and belief in a positive attitude of society toward LGBTQ parenting (OR 2.572, 95%CI 1.207–5.479, $p = 0.014$). Access to fertility preservation services was low. The majority of transgender women (75.3%) and gender diverse people (95.2%) never received a consultation regarding fertility. The utilization rate of fertility treatments was 5.3% in our study.

Conclusion: Transgender women and gender diverse people assigned male at birth have parental desires for a genetically related child. However, access to reproductive information, consultation and services were very limited. Social support along with competent health services might increase access to reproductive services in transgender and gender diverse populations.



KEYWORDS

Fertility preservation; gender diverse family; gender diverse people; gender non-binary; parental wish; reproductive wish; transgender parenting; transgender women; transwomen

Introduction

Transgender and gender diverse people should have the universal basic human right to have biologically related offspring (Coleman et al., 2012). Transgender and gender diverse people do seek to explore fertility options available for their family situation (Murphy, 2010). Over the past several years, assisted reproductive technologies (ART) such as gamete cryopreservation and In-Vitro fertilization (IVF) has enabled transgender and gender diverse people the ability to reproduce. It is now possible to provide assisted

reproductive services for transgender and gender diverse people with different gender identities and sexual orientations. For example, intrauterine insemination (IUI), using donor sperm to impregnate one partner, could be a reasonable choice for a transgender couple in which one has a uterus. In transgender people, fertility options will vary with the availability of gametes and reproductive organs of the person and their partner. For example, a transgender woman with testes can use their own gametes for an IUI or IVF procedure with donor oocytes along with

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surrogacy if her partner does not have a uterus. An alternative could be the use of their own gametes if their partner has a uterus, viable oocytes and is of reproductive age (Mattawanon et al., 2018).

Medical and surgical gender-affirming therapies diminish the reproductive potential of transgender and gender diverse people (Hembree et al., 2017; Mattawanon et al., 2018; Safer & Tangpricha, 2019). Therefore, the American Society of Reproductive Medicine (ASRM), European Society of Human Reproduction and Embryology (ESHRE), World Professional Association for Transgender Health (WPATH), and the Endocrine Society recommend that health care providers discuss future fertility plans and offer fertility preservation before a medical or hormone transition that diminishes fertility (Coleman et al., 2012; Ethics Committee of the American Society for Reproductive Medicine, 2015; Hembree et al., 2017; Martinez, 2017). Despite advances in assisted reproductive technologies, transgender women and gender diverse people are not fully utilizing these services. There have been some studies investigating whether transgender women and gender diverse people actually desire fertility preservation (Auer et al., 2018; Chen et al., 2018; Defreyne et al., 2020a; De Sutter et al., 2002; Nahata et al., 2020; Riggs & Bartholomaeus, 2018). However, access to this common service can be challenging. Transgender and gender diverse people have low rates of gamete cryopreservation (Auer et al., 2018; Defreyne et al., 2020a, 2020b; Nahata et al., 2017; Riggs & Bartholomaeus, 2018; Wierckx, Stuyver, et al., 2012; Wierckx, Van Caenegem, et al., 2012). Possible reasons explaining the low utilization rate are restrictive legislation, difficulties in ejaculation of sperm, the expense and complexity of the procedure, and underestimating the importance of future fertility (Auer et al., 2018; Defreyne et al., 2020a, 2020b; Kyweluk et al., 2018; 2019; Nahata et al., 2017; Riggs & Bartholomaeus, 2018; Tornello & Bos, 2017; Wierckx, Stuyver, et al., 2012; Wierckx, Van Caenegem, et al., 2012). No study has reported on the desires for fertility preservation among transgender women and gender diverse people in the Asian population.

The perceived acceptability of parenthood among transgender women and gender diverse people assigned male at birth also impacts an individual's desire to pursue fertility preservation (American Academy of Pediatrics Committee on Psychosocial Aspects of Child Family and Health, 2013; Boertien & Bernardi, 2019; Bos et al., 2016; Gartrell & Bos, 2010; Pennings, 2011; Wainright et al., 2004). Social acceptance and legislation regarding raising a gender diverse family and LGBTQ parenting differ among countries. A study in the USA in 2017 showed that a majority of people were supportive of doctors helping transgender people to become a biological parent (Goldman et al., 2017). In European countries, a study among undergraduate students in 5 countries found that participants in countries with more progressive laws demonstrated a higher acceptance of parenthood rights and access to ART services in gender variant couples (Yerkes et al., 2018). This points out the importance of legislation regarding civil partnership or same-sex marriage on national attitudes toward parenthood rights of gender-variant people. In Thailand, a gender recognition act has yet to be implemented and civil partnership or same-sex marriage also does not exist. The data on cultural acceptance of parenthood among gender diverse people in Asian countries is also sparse.

The prevalence of transgender women in Thailand is 1.24% which roughly equates to 311,819 transgender women nationwide (Bureau of Epidemiology and Thailand MOPH-US CDC Collaboration (TUC), 2016; Seekaew et al., 2018). However, health services related to gender diversity are limited. Very few cities in Thailand have knowledgeable health care providers that can provide gender affirming care for transgender people. To the best of our knowledge, there have been no previous studies regarding the reproduction needs and social acceptance of LGBTQ parenting in Thailand. Fertility preservation options that are allowed in Thailand are semen cryopreservation for assigned male at birth individuals and oocyte cryopreservation in assigned female at birth individuals. However, only individuals who are recognized to be in a civil marriage have the ability to pursue in-vitro fertilization/embryo transfer or embryo

cryopreservation. In Thailand, marriage between a couple with the same sex-assigned at birth is not allowed by law, which causes a barrier for many transgender and gender-diverse people seeking these fertility options. Currently, transgender women and gender diverse people assigned male at birth have more widely available access to sperm cryopreservation in Thailand. Therefore, we aimed to study how people are utilizing these services and the reason preventing them from accessing fertility preservation.

The purpose of this study was to determine the reproductive desires of transgender women and gender diverse people assigned male at birth and the reasons for seeking or not-seeking fertility preservation services. This study was a cross-sectional study conducted in health centers located in Northern Thailand. The goal of the study was to explore fertility desires and access to fertility preservation services among transgender women and gender diverse people assigned male at birth in order to understand and establish better healthcare for this population.

Material and methods

This study was a cross-sectional study of transgender women and gender diverse individuals assigned male at birth. Subjects were recruited from patients seeking care related to gender transitioning or sexual transmitted infections screening at the Gender care Clinic, Chiang Mai University Hospital, or Mplus foundation clinic between April 2019 and December 2019. The gender care clinic at Chiang Mai University hospital is a tertiary care center that provides psychological assessment, gender affirming hormone therapy and gender affirming surgery. Mplus foundation clinic is a primary care center that provides gender affirming hormone therapy and STIs screening and prevention for gender diverse people in the community. All centers are located in Northern Thailand. Inclusion criteria were (1) sex assigned male at birth and identified as a transgender woman or gender diverse person and confirmed by a trained psychiatrist, (2) age more than 18 years old, (3) able to read and understand Thai language, and (4) voluntarily agree to participate and to disclose their personal information

for the study. Exclusion criteria were (1) holding a diagnosis of a difference of sex development, and (2) not completing or returning the questionnaire form. Participants were screened, consent given and asked to complete the questionnaire booklet for the study during their regular clinical care visits.

Participants were classified into (1) transgender women and (2) gender diverse people assigned male at birth (gender non-binary according to previous medical records) and information obtained from the questionnaire. The study protocol was approved in March 2019 by the ethical committee of the faculty of medicine, Chiang Mai University, Chiang Mai, Thailand (IRB document number 067/2019).

Questionnaire

The questionnaire used in this study consisted of 5 parts. Part 1 included demographics on participants' age, career, religion, financial status, marital status, and the relationship of participants with their biological family. Part 2 included information on gender identities, sexual expression, sexual orientation, and hormonal or surgical reassignment procedure. The participants were asked to identify their gender identity, sexual expression, and sexual orientation in a multiple choice manner. All items had an "other please specify" for the participants who felt that the choices provided did not match their identity.

Part 3 was to assess the degree of gender dysphoria using the Thai version of the Utrecht gender dysphoria scale (UGDS-Thai-MTF). The UGDS questionnaire was translated from English to Thai language under the permission of the original author (Cohen-Kettenis & van Goozen, 1997). This questionnaire had 12 items on a Likert-5-point scale with the total scale ranged from 12 to 60. A higher score indicated a higher level of gender dysphoria. A forward translation procedure was performed by 2 individual physicians familiar with transgender care. Any incongruence was discussed to create the UGDS-Thai-MTF version. This questionnaire was also proof-read by 2 transgender woman physicians to avoid offensive language yet retained the conciseness of the original version. Backward translation was

done by a linguistician before sending it to the original author for approval. The UGDS-Thai-MTF has been validated and had an Index of Item-Objective Congruence (IOC) of 0.87 and an overall Cronbach's alpha of 0.97. The sensitivity of the test was 92% and specificity of 96% when the cut point was 40 as set by the previous study (Steensma et al., 2013).

Part 4 evaluated reproductive wishes and obstacles that prevented participants from accessing reproductive services. This set of questions was exclusively created for this study. It focused on 4 major topics including (1) reproductive desires, (2) access to reproductive healthcare, (3) obstacles that prevented the access to reproductive services and (4) the obstacles to having a child. The content of this questionnaire was validated by 6 physicians (5 reproductive specialists and 1 psychiatrist at Chiang Mai University Hospital. The IOC of this questionnaire was 0.875. The questionnaire in English is provided as a supplement (Supplement 1).

The quality of life of the participants was assessed using WHOQOL-BREF-THAI. This scale was a Likert 5 point scale that contained 26 items on physical, psychological, social, and environmental aspects. The overall score ranged from 26 to 130. The score of 26–60 represented a poor quality of life, 61–95 indicated a medium level of quality of life, and 96–130 represented a good quality of life.

Statistical analysis

Data distribution of all variables was tested using the Shapiro-Wilk test before analysis. Categorical variables were reported using frequency and percentage. To test the difference between groups, Chi-square or Fisher's exact test was used depending on the condition of data. For continuous variables, mean and standard deviation were used. In data that was not normally distributed, medians and interquartile ranges (IQRs) were used. To test the difference between groups, the Mann-Whitney U test/Wilcoxon rank-sum test was used in non-normal distributed data. Univariate logistic regression analysis was used to identify items that significantly related to the wish to have a child. Any items in the univariate

logistic regression analysis that yielded a p-value of less than 0.2 were then included for a multiple logistic regression backward elimination analysis. All statistical analyzes were performed using STATA (Stata Statistical Software: Release 14 (College Station, TX: StataCorp LP).

Results

Three hundred and twelve participants who visited the Gender care clinic at Chiang Mai University Hospital or Mplus foundation clinic during the study period agreed to participate in this study. Of these, 6 participants were excluded due to a failure to return the questionnaire, 3 participants were excluded due to missing important data regarding gender identity and expression. Data from 303 participants were included for the final analysis, 199 participants were transgender women and 104 participants were gender diverse persons assigned male at birth (Figure 1).

The median age of participants was 25 years old [IQR 21–29]. The majority of the participants indicated Buddhism as their religion, had fair to good financial status, had a good relationship with their parents and were single. Transgender women gained more family acceptance than gender diverse people ($p = < 0.001$). Twenty-two participants (15 transgender women and 7 gender diverse people) already had a genetically related child. All children were conceived naturally. The mean age of this group was not statistically different from the group with no child at 25.3 ± 6.1 and 25.6 ± 5.9 years old, respectively, $p = 0.66$. Regarding the quality of life, all groups demonstrated good quality of life in overall, physical, social, and environmental aspects. However, transgender women had a lower score in psychological aspects than those of gender diverse people (median [IQR] of 21 [19–23] and 23 [21–24] respectively, $p < 0.001$). The demographic data of the participants were provided in Table 1.

Data related to gender identities, sexual orientation, and treatment associated with gender was reported in Table 1. The majority of the transgender women participants experienced gender dysphoria before the age of 7 years old (75.5%), desired to have a feminine expression (82.9%), and were currently on gender affirming hormone

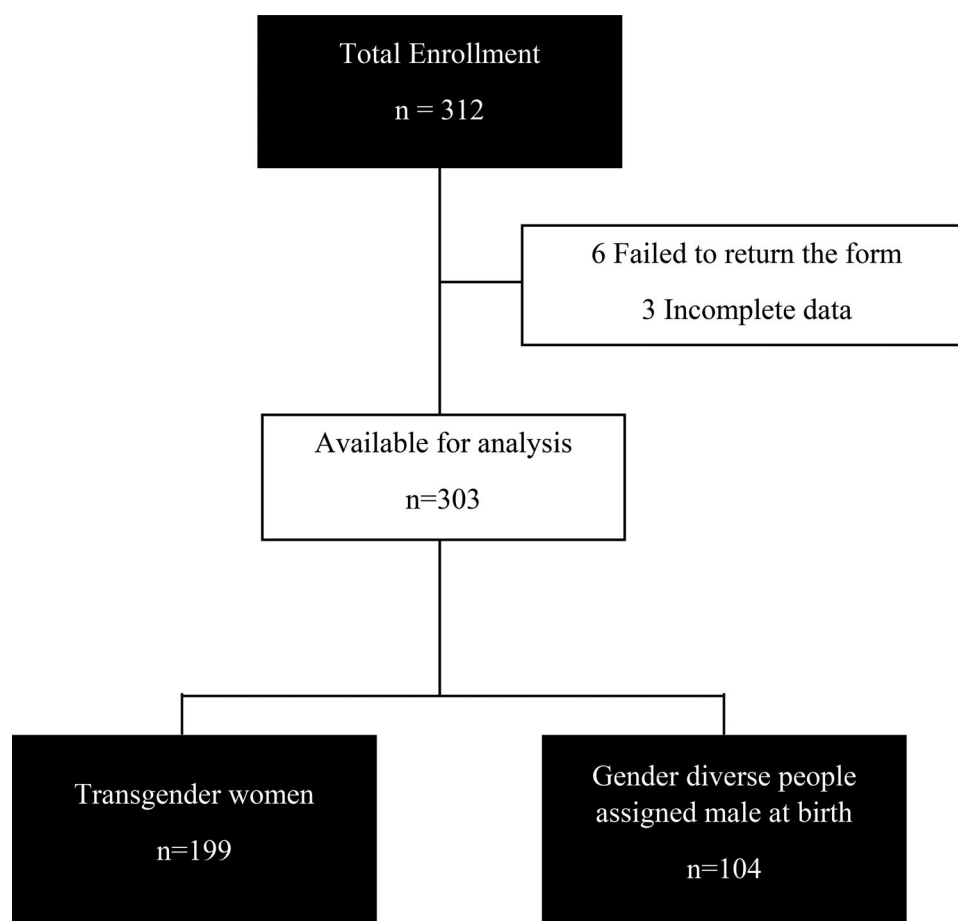


Figure 1. Enrollment flow chart.

therapy (GAHT) (77.1%). Both transgender women and gender diverse participants in our study were predominantly androphilic (97.0% of transgender women and 80.8% of gender diverse people). Regarding the gender dysphoria scale, transgender women had a significantly higher score than those of gender diverse people (median score of 44 and 27.5 respectively, $p < 0.001$).

Parental desires

The overall desire to become a parent was 30.4% which was similar among the 2 groups (30.65% of transgender women, 29.81% of gender diverse people, $p = 0.879$) as shown in Table 2. In terms of age and parental desire, 26.47% of the participants younger than 25 years old and 35.34% of those who were older had a current parental desire (OR 1.518, 95%CI 0.928–2.484, $p = 0.096$). Univariate logistic regression analysis found that participants who were in a stable relationship,

already had a genetically-related child, had better financial status, had a good relationship with their family, or had higher QOL scores were more likely to have a parental desire.

Multiple logistic regression analysis was performed and adjusted with age, marital status, having or not having a previous child, relationship with family, family acceptance level, economic status, onset of gender dysphoria, quality of life score, current hormonal use, attitude of society toward LGBTQ parenting, effects of society on a decision to be a parent. The results found that participants who had a good relationship with their family had a higher parental desire than those who had a poor relationship (OR 2.905, 95% CI 1.315–6.420, $p = 0.008$). Participants who were in a stable relationship with their partner would a higher parental desire compared to participants who were single or in an unstable relationship (OR 4.183, 95% CI 1.738–10.069, $p = 0.001$). Participants who believed that society was supportive of LGBTQ

Table 1. Demographic data of study participants assigned male at birth.

	Transgender women (n = 199)	Gender diverse people assigned male at birth (n = 104)	p-value
Median age (years) [IQR]	25 [21–30]	23.5 [21–28]	0.121 ^a
Relationship status^b			
Single	164 (82.8%)	73 (70.2%)	0.010 ^c
In an unstable relationship	23 (11.6%)	15 (14.4%)	
In a stable relationship	11 (5.6%)	16 (15.4%)	
Religion			
Buddhism	190 (95.5%)	98 (96.1%)	1.000 ^d
Christianity	9 (4.5%)	4 (3.9%)	
Not religion/other	–	–	
Already have a genetically-related child			0.896 ^d
Yes	15 (7.5%)	7 (6.7%)	
No	184 (92.4%)	97 (93.3%)	
Family awareness of participants' gender identity			
Yes	170 (85.4%)	75 (72.8%)	0.001 ^c
No	8 (4.0%)	17 (16.5%)	
Not sure	21 (10.6%)	11 (10.7%)	
Family acceptance of participants' gender identity			
Very acceptable	145 (73.2%)	43 (41.7%)	<0.001 ^c
Somewhat acceptable	48 (24.3%)	53 (51.5%)	
Unacceptable	5 (2.5%)	7 (6.8%)	
Relationship with family			
Good	158 (79.8%)	83 (80.6%)	0.405 ^c
Average	33 (16.7%)	19 (18.4%)	
Poor	7 (3.5%)	1 (1.0%)	
Financial status of the participant			
Above average	85 (42.7%)	27 (25.9%)	0.016 ^c
Average	104 (52.3%)	71 (68.3%)	
Below average	10 (5.0%)	6 (5.8%)	
Utrecht gender dysphoria scale (Median [IQR])	44 [39–50]	27.5 [14–35]	<0.001 ^a
Quality of life (Median [IQR])			
Overall aspect	93 [84–103]	98 [88–107]	0.066 ^a
Physical aspect	24 [22–28]	24 [22–28]	0.555 ^a
Psychological aspect	21 [19–23]	23 [21–24]	<0.001 ^a
Social relationship aspect	12 [10–12]	12 [11–13]	0.031 ^a
Environmental aspect	29 [24–32]	28 [26–32]	0.486 ^a
Gender identity			
Female	121 (60.8%)	–	N/A
More female than male	69 (34.7%)	39 (37.5%)	
More male than female	3 (1.5%)	54 (51.9%)	
Male	–	–	
Others (agender, cannot be classified)	6 (3.0%)	11 (10.6%)	
Onset of gender dysphoria			
Since very young	101 (63.5%)	25 (27.5%)	N/A
Before primary school	19 (12.0%)	3 (3.3%)	
During primary school	22 (13.8%)	16 (17.6%)	
After primary school	16 (10.1%)	15 (16.5%)	
Do not have GD	1 (0.6%)	32 (35.1%)	
Desire to have a feminine gender expression			
Yes	165 (82.9%)	6 (5.8%)	N/A
No	19 (9.6%)	69 (66.3%)	
Not sure	15 (7.5%)	29 (27.9%)	
Hormonal use			
Yes	152 (77.1%)	8 (7.9%)	N/A
Plan to use	22 (11.2%)	12 (11.9%)	
Never want to use	23 (11.7%)	81 (80.2%)	
Gender affirmation surgery			
Breast augmentation	36 (18.1%)	–	N/A
Genital surgery	11 (5.5%)	1 (1%)	
Have a plan to surgery	123 (61.8%)	6 (5.8%)	
No surgery desired	37 (18.6%)	97 (93.3%)	
Sexual partners (sexually attracted to)			
Male	193 (97.0%)	84 (80.8%)	N/A
Female	1 (0.5%)	5 (4.8%)	
Both male and female	1 (0.5%)	6 (5.8%)	
Pansexual	3 (1.5%)	9 (8.6%)	
Asexual	1 (0.5%)	–	

^aThe Mann–Whitney U test/Wilcoxon rank-sum test.^bCivil partnership or same-sex marriage is not legalized in Thailand.^cChi-square.^dFisher's exact.

Table 2. Univariate logistic regression analysis for reproductive desires in study participants assigned male at birth.

Variables	n/N (%)	p-value	Odds ratio (95% CI)
Participant group		0.897	
Transgender women	61/199 (30.65)		1.041 (0.621–1.746)
Gender diverse people assigned male at birth	31/104 (29.81)		1
Age		0.096	
<25 years old	45/170 (26.47)		1
≥25 years old	47/133 (35.34)		1.518 (0.928–2.484)
Already have a genetically-related child		0.004	
Yes	13/22 (59.09)		3.704 (1.522–9.012)
No	78/278 (28.06)		1
Religion		0.881	
Buddhism	88/289 (30.45)		1.095 (0.334–3.584)
Christianity/other	4/14 (28.57)		1
Relationship with family		0.002	
Good	83/241 (34.44)		2.977 (1.397–6.345)
Average or Poor	9/60 (15.00)		1
Family acceptance of participants' gender		0.801	
Very acceptable	56/188 (29.79)		1.273 (0.332–4.878)
Somewhat acceptable	33/101 (32.67)		1.456 (0.370–5.736)
Unacceptable	3/12 (25.00)		1
Current marital status		<0.001	
Single/Unstable relationship	74/275 (26.91)		1
Stable relationship	17/27 (62.96)		4.618 (2.023–10.540)
Economic status		0.069	
Good	27/112 (24.11)		1.376 (0.365–5.194)
Average	62/175 (35.43)		2.378 (0.652–8.663)
Bad	3/16 (18.75)		1
What do you think about the attitude of society toward LGBTQ parenting		<0.001	
Very acceptable	22/50 (44.00)		3.489 (1.72–7.076)
Somewhat acceptable	45/116 (38.79)		2.814 (1.587–4.988)
Not acceptable nor unacceptable/ Somewhat/Totally unacceptable	25/136 (18.38)		1
Utrecht gender dysphoria scale		0.457	
≥40	48/148 (32.43)		1.206 (0.736–1.974)
<40	43/151 (28.48)		1
Quality of life score (overall aspect)		0.018	
Good	48/125 (38.40)		1.870 (1.11–3.151)
Moderate/Low	36/144 (25.00)		1

n the number of participants who wish to have a child.

N, the number of the whole participants in the group.

parenting had a higher parental desire (OR 2.572, 95% CI 1.207–5.479, $p = 0.014$). Participant who had already have a genetically related child also showed a higher parental desire (OR 3.640, 95% CI 1.366–9.700, $p = 0.010$).

Access to fertility services and fertility preservation

The majority of our participants (75.3% of transgender women and 95.2% of gender diverse people assigned male at birth) never received any information on fertility preservation. One-fifth of the participants (22.2% of transgender women and 20.8% of gender diverse people assigned male at birth) would have completed sperm freezing if it was offered in the past. However, only 18.7% of transgender women would delay GAHT to have fertility preservation and 7.1% completed sperm

cryopreservation prior to initiating GAHT (Table 3). In 152 transgender women currently on GAHT, 70.39% never received counseling on fertility preservation, 46.4% were not aware of the detrimental effects of GAHT on fertility, and 25.8% would have completed sperm cryopreservation if it was offered before the initiation of GAHT. Regarding a current desire to perform fertility preservation, 26.3% of transgender women and 23.1% of gender diverse people wanted to preserve the gamete if it was offered now.

Genetic relation to a child was considered important in 40.9% of transgender women group and 50.5% of gender diverse people ($p = 0.115$). Regarding a preferred source of gametes, gender diverse people had more desire to use their own gametes to conceive a child at 60.6% while transgender women were more open to use her partner's gamete at 57.8% (Table 3).

Table 3. Attitude toward reproduction, reproductive services and access to reproductive services in study participants assigned male at birth.

	Transgender women (n = 199)	Gender diverse people assigned male at birth (n = 104)	p-value
Do you wish to be a parent?			
Yes	61 (30.8%)	31 (30.1%)	<0.001
No	82 (41.4%)	16 (15.5%)	
Not sure	39 (19.7%)	31 (30.1%)	
Never think about this before	16 (8.1%)	25 (24.3%)	
Is a genetic relation to your child important to you?			
Yes	76 (40.9%)	52 (50.5%)	0.115
No	110 (59.1%)	51 (49.5%)	
Have you ever received any consultation regarding fertility preservation or future reproduction?			
Yes	49 (24.7%)	5 (4.8%)	<0.001
No	149 (75.3%)	99 (95.2%)	
Do you think fertility preservation is important enough to delay hormonal treatment?			
Yes	37 (18.7%)	15 (14.4%)	0.103
No	78 (39.4%)	32 (30.8%)	
Not sure	83 (41.9%)	57 (54.8%)	
Have you completed any fertility treatment or fertility preservation?			
Yes	14 (7.1%)	2 (1.9%)	0.104 ^a
No	184 (92.9%)	101 (98.1%)	
If a doctor offers to cryopreserve your gametes now, would you do it?			
Yes	52 (26.3%)	24 (23.1%)	0.135
No	115 (58.1%)	33 (31.7%)	
Not sure	31 (15.7%)	47 (45.2%)	
Acceptable sources of sperm to create embryos			
Own sperm	65 (32.7%)	63 (60.6%)	<0.001
Partner sperm	115 (57.8%)	29 (27.9%)	<0.001
Donor sperms from relatives or friends	12 (6.0%)	9 (8.6%)	0.393
Donor sperm from anonymous donor	2 (1.0%)	2 (1.9%)	0.609 ^a
The influence of society on your decision to be a parent			
Strongly affect	42 (21.5%)	12 (12.1%)	0.001
Somewhat affect	104 (53.4%)	39 (39.4%)	
Minimal affect	30 (15.4%)	25 (25.3%)	
No effect at all	19 (9.7%)	23 (23.2%)	
What do you think about the attitude of society toward LGBTQ parenting			
Very acceptable	29 (14.7%)	21 (20.2%)	0.001
Somewhat acceptable	80 (40.4%)	36 (34.6%)	
Not acceptable nor unacceptable	66 (33.3%)	40 (38.5%)	
Somewhat unacceptable	20 (10.1%)	6 (5.8%)	
Totally unacceptable	3 (1.5%)	1 (1.0%)	

Chi-square was used to test the difference between groups unless otherwise specified.

^aFisher's exact.

Social acceptance toward reproduction in the transgender and gender diverse population

Social climate affected the decision on parental desire in 74.9% of transgender women and 51.5% of gender diverse people assigned male at birth. When asked “What do you think about the attitude of society toward LGBTQ parenting”, more

than half of the participants believed that the public was somewhat or very acceptable (Table 3).

Finally, a major obstacle discouraging a participant from being a parent was a thought that their gender identity might affect a child's well-being (28.7% of the overall participants, 30.7% of transgender women and 25% of gender diverse people

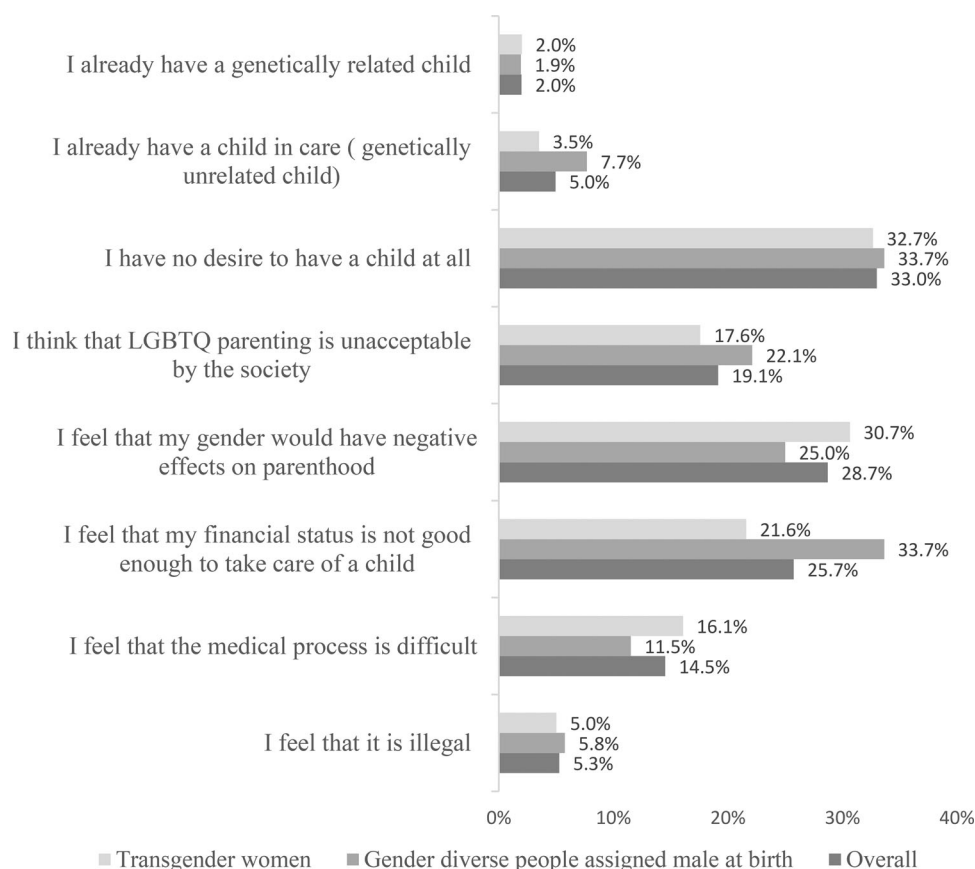


Figure 2. Reasons why participants do not desire to become a parent.

assigned male at birth). Another quarter of the subjects gave up their parental wish because of the financial constrain. Difficulties in fertility preservation techniques were another discouraging factor in 14.5% of the overall participants (Figure 2).

Discussion

The main objective of this study was to compare and contrast reproductive desires in transgender women and gender diverse individuals assigned male at birth and describe access and obstacles to reproductive services in Thailand. The overall parental desire was 30.4%, which was similar in both groups. About 25% of all subjects would consider sperm cryopreservation if it was offered and nearly half of the participants had a desire to have a biologically related child. The participants felt more positive about having a child if they believed it was supported by society. Finally, we found that a large majority of transgender women and gender diverse individuals did not

receive any counseling regarding fertility preservation.

This study is the first study regarding the parental desires of transgender women and gender diverse people assigned male at birth in Thailand. As the desire to have a child is a complex issue, studies in non-Asian countries may not be generalizable to Asian countries. Parental desire in our participants was around one third, which was higher than recent studies in Belgium and Germany that reported a parental desire of 15.4 – 28.0% in transgender women participants (Auer et al., 2018; Defreyne et al., 2020a). Our study also found that transgender women and gender diverse people assigned male at birth had a similar desire to become a parent which is in contrast to a previous study where a parental desire in transgender women was higher than gender diverse group (Defreyne et al., 2020a). The reason why our participants had a higher desire to become a parent regardless of gender identity is still unclear. We hypothesized that, in our setting, a parental desire might correlate

more with general well-being and strong family and social support than the gender identity of participants. Previous studies had shown a positive correlation between family/social support and parental desire (Riggs et al., 2016; von Doussa et al., 2015). Our study echoed those findings, as after controlling all possible confounders, the multivariate regression pointed out that the factors affecting parental desire were (1) having a good relationship with families/parents, (2) being in a stable relationship with their partner, (3) being in fair to good financial status, (4) believing that people around them were positive about LGBTQ parenting. According to our data, participants who already had a genetically-related child were 3 times more likely to have a current parental desire. Although our finding showed a correlation between already having a child and a current parental wish, further study in a larger population is needed to confirm this finding due to a limited number of participants in this group (15 transgender women and 7 gender diverse people). Another noteworthy point was the young age of our participants. The median age was 25 years old which was younger than all previous studies (Auer et al., 2018; De Sutter et al., 2002; Defreyne et al., 2020a; Riggs & Bartholomaeus, 2018; Wierckx, Stuyver, et al., 2012). We found that the desire to be a parent tended to be higher in older participants. Although it was not statistically significant, this is important to note as parental desires could change over time in individuals starting GAHT at a younger age. Thus, detailed information on fertility preservation should be given to younger transgender and gender diverse individuals, especially prior to GAHT and/or gender affirmation surgery.

Even though this study was primarily clinic-based, access to reproductive information was remarkably low. The majority of transgender women never received information regarding fertility and fertility preservation. Even among transgender women on GAHT, more than 40% were not aware of the adverse effects of the hormones on their fertility. Many transgender women in Thailand accessed GAHT at a young age by themselves without medical supervision. In Thailand, the cost of a monthly supply of

estrogen can be as low as 5–15 U.S. Dollars and is available without a prescription. This may be one of the reasons transgender women have not received proper pre-medical evaluation and counseling for safe hormonal use. Inadequate medical training of hormone providers is likely the second reason for inadequate counseling regarding fertility preservation in transgender women. A study in 2019 by Tishelman et al. found that even when training courses were available, health care providers reported insufficient knowledge regarding reproductive and fertility preservation in transgender women and gender diverse people and reported discussing fertility preservation to be difficult (Tishelman et al., 2019). We have no data about the level of medical knowledge in transgender health among Thai health providers. However, we suspect that competencies in providing counseling on fertility preservation in transgender women and gender diverse people assigned male at birth would be low.

Fertility preservation in transgender women and gender diverse people has been raised as an important concern for the past decade, our study highlights that sperm cryopreservation rates still remain low among transgender women (Auer et al., 2018; Defreyne et al., 2020a; Nahata et al., 2017; Riggs & Bartholomaeus, 2018; Wierckx, Stuyver, et al., 2012). The utilization of sperm cryopreservation as a means to preserve their reproduction might vary depending on an individual's parental desire and desire to have a child that is biologically related (Defreyne et al., 2020a; Mattawanon et al., 2018). The majority of Thai transgender women felt that it was acceptable to use their partner's gametes as an acceptable source to create embryos. Although the cost for sperm cryopreservation in Thailand was rather affordable (45 USD per year at Chiang Mai university hospital), utilization of this service was low. One potential barrier to fertility preservation services for transgender women and gender diverse people is legal restrictions regarding IVF. In Thailand, IVF services are primarily restricted to heterosexual couples with marriage certificates. This legal restriction may have prevented transgender women and their providers to even consider fertility preservation as a possible option. During the time of this study, adoption and

fostering children are not options for gender diverse people in Thailand.

Our study adds additional information regarding reproductive wishes in gender diverse people assigned male at birth. There has been limited number of studies exploring this topic in gender diverse people (Chen et al., 2018; Defreyne et al., 2020a; Nahata et al., 2020; Riggs & Bartholomaeus, 2018). A recent study by Defreyne et al. in Belgium reported a low parental desire at 9.1% in gender non-binary adult assigned male at birth (Defreyne et al., 2020a). In comparison, we found that our cohort of gender diverse people assigned male at birth had a higher parental desire (30.1%) and half of the cohort desired to have a genetically related child. It is unclear how GAHT impacts fertility in gender diverse people as hormone regimens are individual to each person's gender identity. Our study found up to 20% of gender diverse people assigned male at birth participants were currently using or had a plan to use GAHT. Unfortunately, only 4.8% of gender diverse individuals in our study had a discussion regarding fertility preservation. Our study highlights the need to have fertility preservation discussions with gender diverse individuals as well as transgender women.

Another key finding in our study was that the sexual orientation of transgender women and gender diverse people assigned male at birth in Thailand was very much different from those reported from other countries. In Europe, close to half (39.8%–47.9%) of transgender women and gender diverse people assigned male at birth are sexually attracted to women (Auer et al., 2018; Defreyne et al., 2020a). In Thailand, we found that 97% of transgender women and 80.8% of gender diverse people assigned male at birth were sexually attracted to only men and less than 5% attracted to women or both men and women. The reason behind the differences of sexual orientation of transgender women and gender diverse people in this study from cohorts in Europe has yet to be elucidated, but likely reflects a combination of societal and cultural factors.

Study limitations

Our study was a cross-sectional descriptive study where all the data was obtained based on study

participants' responses to a written questionnaire. The richness of these data might be inferior to an in-depth semi-qualitative interview. One of the limitations of our article is that we focus only on transgender women and gender diverse people assigned male at birth. This is primarily due to the fact that our clinic only offers sperm cryopreservation as a fertility preservation option for this population. Our results are not generalizable to transgender men and gender diverse people assigned female at birth. As our participants were recruited from a clinic setting, there may be selection bias toward individuals who may be more knowledgeable about potential medical services available for fertility and may have better financial resources. However, our clinics are not exclusive only to those who have medical insurance and do provide some free services to the community. Furthermore, our study may not be generalizable to all parts of Asia. Our study participants reside in a smaller city in Thailand and may not be fully representative of large metropolitan cities in Asia, including Bangkok, Thailand. Finally, the sexual orientation of our study subjects differed from published reports of parental desires among transgender women. A limited number of transgender women who were attracted to women may also limit the applicability of these findings to other populations.

Conclusion

Our study adds to the growing literature on reproductive desires among transgender and gender diverse people assigned male at birth. About one-third of transgender and gender diverse people assigned male at birth have parental desire but very few receive counseling. There are many factors that may explain the low rate of fertility preservation among transgender and gender diverse people, including, lack of counseling, inexperienced medical providers, legal issues and societal support. Longer term studies in this population and additional information regarding the societal acceptance of a gender diverse family and LGBTQ parenting would be important to understanding the low rates of fertility preservation among Thai transgender and gender diverse individuals.

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Conflict of interest

The authors declare that they have no conflict of interest.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the Chiang Mai university research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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References

- American Academy of Pediatrics Committee on Psychosocial Aspects of Child Family and Health. (2013). Promoting the well-being of children whose parents are gay or lesbian. *Pediatrics*, 131(4), 827–830. <https://doi.org/10.1542/peds.2013-0376>
- Auer, M. K., Fuss, J., Nieder, T. O., Briken, P., Biedermann, S. V., Stalla, G. K., Beckmann, M. W., & Hildebrandt, T. (2018). Desire to have children among transgender people in Germany: A cross-sectional multi-center study. *The Journal of Sexual Medicine*, 15(5), 757–767. <https://doi.org/10.1016/j.jsxm.2018.03.083>
- Boertien, D., & Bernardi, F. (2019). Same-sex parents and children's school progress: An association that disappeared over time. *Demography*, 56(2), 477–501. <https://doi.org/10.1007/s13524-018-0759-3>
- Bos, H. M., Knox, J. R., van Rijn-van Gelderen, L., & Gartrell, N. K. (2016). Same-sex and different-sex parent households and child health outcomes: Findings from the national survey of children's health. *Journal of Developmental and Behavioral Pediatrics: JDBP*, 37(3), 179–187. <https://doi.org/10.1097/DBP.0000000000000288>
- Bureau of Epidemiology and Thailand MOPH-US CDC Collaboration (TUC). (2016). Estimates of the size of key population at risk for HIV infection. Available from <https://hivhub.ddc.moph.go.th/report.php>
- Chen, D., Matson, M., Macapagal, K., Johnson, E. K., Rosoklija, I., Finlayson, C., Fisher, C. B., & Mustanski, B. (2018). Attitudes toward fertility and reproductive health among transgender and gender-nonconforming adolescents. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 63(1), 62–68. <https://doi.org/10.1016/j.jadohealth.2017.11.306>
- Cohen-Kettenis, P. T., & van Goozen, S. H. (1997). Sex reassignment of adolescent transsexuals: A follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36(2), 263–271. <https://doi.org/10.1097/00004583-199702000-00017>
- Coleman, E., Bockting, W., Botzer, M., Cohen-Kettenis, P., DeCuypere, G., Feldman, J., Fraser, L., Green, J., Knudson, G., Meyer, W. J., Monstrey, S., Adler, R. K., Brown, G. R., Devor, A. H., Ehrbar, R., Ettner, R., Eyler, E., Garofalo, R., Karasic, D. H., ... Zucker, K. (2012). Standards of care for the health of transsexual, transgender, and gender-nonconforming people, version 7. *International Journal of Transgenderism*, 13(4), 165–232. <https://doi.org/10.1080/15532739.2011.700873>
- De Sutter, P., Kira, K., Verschoor, A., & Hotimsky, A. (2002). The desire to have children and the preservation of fertility in transsexual women: A survey. *International Journal of Transgenderism*, 6(3).
- Defreyne, J., Van Schuylenbergh, J., Motmans, J., Tilleman, K. L., & T'Sjoen, G. G. (2020a). Parental desire and fertility preservation in assigned male at birth transgender people living in Belgium. *International Journal of Transgender Health*, 21(1), 45–57. <https://doi.org/10.1080/15532739.2019.1692750>
- Defreyne, J., Van Schuylenbergh, J., Motmans, J., Tilleman, K. L., & T'Sjoen, G. G. R. (2020b). Parental desire and fertility preservation in assigned female at birth transgender people living in Belgium. *Fertility and Sterility*, 113(1), 149–157.e142. <https://doi.org/10.1016/j.fertnstert.2019.09.002>
- Ethics Committee of the American Society for Reproductive Medicine. (2015). Access to fertility services by transgender persons: an Ethics Committee opinion. *Fertility and Sterility*, 104(5), 1111–1115. <https://doi.org/10.1016/j.fertnstert.2015.08.021>
- Gartrell, N., & Bos, H. (2010). US national longitudinal lesbian family study: Psychological adjustment of 17-year-old adolescents. *Pediatrics*, 126(1), 28–36. <https://doi.org/10.1542/peds.2009-3153>
- Goldman, R. H., Kaser, D. J., Missmer, S. A., Farland, L. V., Scout Ashby, R. K., & Ginsburg, E. S. (2017). Fertility treatment for the transgender community: A public opinion study. *Journal of Assisted Reproduction and Genetics*, 34(11), 1457–1467. <https://doi.org/10.1007/s10815-017-1035-y>

- Hembree, W. C., Cohen-Kettenis, P. T., Gooren, L., Hannema, S. E., Meyer, W. J., Murad, M. H., Rosenthal, S. M., Safer, J. D., Tangpricha, V., & T'Sjoen, G. G. (2017). Endocrine treatment of gender-dysphoric/gender-incongruent persons: An endocrine society clinical practice guideline. *The Journal of Clinical Endocrinology and Metabolism*, 102(11), 3869–3903. <https://doi.org/10.1210/jc.2017-01658>
- Kyweluk, M. A., Reinecke, J., & Chen, D. (2019). Fertility preservation legislation in the United States: Potential implications for transgender individuals. *LGBT Health*, 6(7), 331–334. <https://doi.org/10.1089/lgbt.2019.0017>
- Kyweluk, M. A., Sajwani, A., & Chen, D. (2018). Freezing for the future: Transgender youth respond to medical fertility preservation. *International Journal of Transgenderism*, 19(4), 401–416. <https://doi.org/10.1080/15532739.2018.1505575>
- Martinez, F. (2017). Update on fertility preservation from the Barcelona International Society for fertility preservation-ESHRE-ASRM 2015 expert meeting: Indications, results and future perspectives. *Human Reproduction (Oxford, England)*, 32(9), 1802–1811. <https://doi.org/10.1093/humrep/dex218>
- Mattawanon, N., Spencer, J. B., Schirmer, D. A., & Tangpricha, V. (2018). Fertility preservation options in transgender people: A review. *Reviews in Endocrine & Metabolic Disorders*, 19(3), 231–242. <https://doi.org/10.1007/s11154-018-9462-3>
- Murphy, T. F. (2010). The ethics of helping transgender men and women have children. *Perspectives in Biology and Medicine*, 53(1), 46–60. <https://doi.org/10.1353/pbm.0.0138>
- Nahata, L., Chen, D., Quinn, G. P., Travis, M., Grannis, C., Nelson, E., & Tishelman, A. C. (2020). Reproductive attitudes and behaviors among transgender/nonbinary adolescents. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 66(3), 372–374. <https://doi.org/10.1016/j.jadohealth.2019.09.008>
- Nahata, L., Tishelman, A. C., Caltabellotta, N. M., & Quinn, G. P. (2017). Low fertility preservation utilization among transgender youth. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 61(1), 40–44. <https://doi.org/10.1016/j.jadohealth.2016.12.012>
- Pennings, G. (2011). Evaluating the welfare of the child in same-sex families. *Human Reproduction (Oxford, England)*, 26(7), 1609–1615. <https://doi.org/10.1093/humrep/der109>
- Riggs, D. W., & Bartholomaeus, C. (2018). Fertility preservation decision making amongst Australian transgender and non-binary adults. *Reproductive Health*, 15(1), 181. <https://doi.org/10.1186/s12978-018-0627-z>
- Riggs, D. W., Power, J., & von Doussa, H. (2016). Parenting and Australian trans and gender diverse people: An exploratory survey. *International Journal of Transgenderism*, 17(2), 59–65. <https://doi.org/10.1080/15532739.2016.1149539>
- Safer, J. D., & Tangpricha, V. (2019). Care of transgender persons. *New England Journal of Medicine*, 381(25), 2451–2460. <https://doi.org/10.1056/NEJMcp1903650>
- Seekaew, P., Pengnonyang, S., Jantarapakde, J., Sungsing, T., Rodbumrung, P., Trachunthong, D., Cheng, C. L., Nakpor, T., Reankhomfu, R., Lingjongrat, D., Janyam, S., Charoenying, S., Mills, S., Cassell, M., Phanuphak, P., Vannakit, R., & Phanuphak, N. (2018). Characteristics and HIV epidemiologic profiles of men who have sex with men and transgender women in key population-led test and treat cohorts in Thailand. *PLoS One*, 13(8), e0203294. <https://doi.org/10.1371/journal.pone.0203294>
- Steensma, T. D., Kreukels, B. P. C., Jurgensen, M., Thyen, U., de Vries, A. L. C., & Cohen-Kettenis, P. T. (2013). *The Utrecht Gender Dysphoria Scale: A validation study*. <https://research.vu.nl/ws/portalfiles/portal/42,117,774/hooofdstuk+03.pdf>
- Tishelman, A. C., Sutter, M. E., Chen, D., Sampson, A., Nahata, L., Kolbuck, V. D., & Quinn, G. P. (2019). Health care provider perceptions of fertility preservation barriers and challenges with transgender patients and families: Qualitative responses to an international survey. *Journal of Assisted Reproduction and Genetics*, 36(3), 579–588. <https://doi.org/10.1007/s10815-018-1395-y>
- Tornello, S. L., & Bos, H. (2017). Parenting intentions among transgender individuals. *LGBT Health*, 4(2), 115–120. <https://doi.org/10.1089/lgbt.2016.0153>
- von Doussa, H., Power, J., & Riggs, D. (2015). Imagining parenthood: The possibilities and experiences of parenthood among transgender people. *Culture, Health & Sexuality*, 17(9), 1119–1131. <https://doi.org/10.1080/13691058.2015.1042919>
- Wainright, J. L., Russell, S. T., & Patterson, C. J. (2004). Psychosocial adjustment, school outcomes, and romantic relationships of adolescents with same-sex parents. *Child Development*, 75(6), 1886–1898. <https://doi.org/10.1111/j.1467-8624.2004.00823.x>
- Wierckx, K., Stuyver, I., Weyers, S., Hamada, A., Agarwal, A., De Sutter, P., & T'Sjoen, G. (2012). Sperm freezing in transsexual women. *Archives of Sexual Behavior*, 41(5), 1069–1071. <https://doi.org/10.1007/s10508-012-0012-x>
- Wierckx, K., Van Caenegem, E., Pennings, G., Elaut, E., Dedeker, D., Van de Peer, F., Weyers, S., De Sutter, P., & T'Sjoen, G. (2012). Reproductive wish in transsexual men. *Human Reproduction (Oxford, England)*, 27(2), 483–487. <https://doi.org/10.1093/humrep/der406>
- Yerkes, M. A., Dotti Sani, G. M., & Solera, C. (2018). Attitudes toward parenthood, partnership, and social rights for diverse families: Evidence from a pilot study in five countries. *Journal of Homosexuality*, 65(1), 80–99. <https://doi.org/10.1080/00918369.2017.1310507>